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(54) Title: NEURONAL CELL LINEAGES AND METHODS OF PRODUCTION THEREOF

(57) Abstract: Methods are provided in which a sterol-depleting agent such as  $\beta$ -cyclodextrin ( $\beta$ CD), is used to modulate signaling by a differentiation signaling protein such as Hedgehog protein or a BMP *in vitro*. As illustrated herein, the use of  $\beta$ CD in conjunction with Sonic Hedgehog N-terminal peptide (ShhN) causes substantially all of the cells in neural plate explants to differentiate as neurons, such as motor neurons. Also provided are cell therapy methods and screening methods that rely on the modulation of signaling of a differentiation signaling protein such as Hedgehog, by a sterol-depleting agent such as  $\beta$ CD.

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